Fact Sheet
California Environmental Protection Agency
Air Resources Board

Battery Electric Vehicles

Refueling, Energy Use and Charging

The success of the Air Resources Board's zero emission vehicle (ZEV) program can be seen today through the growing availability of hybrid electric vehicles and near-zero emission gasoline combustion vehicles. Although the battery electric vehicle (EV) market has changed recently due to a shift to fuel cell technology, there have been over 4,000 EVs on California's roads and many remain on the roads today.

In addition, the market for city and neighborhood EVs continues to be strong. These smaller EVs are inexpensive, have zero tailpipe emissions, and provide excellent around town transportation. Information and incentives on these and other clean vehicles may be found at www.DriveClean.ca.gov. This document provides general information about EVs, including refueling, energy use, and public and private charging.

Refueling EVs

Electric vehicles are "fueled" by a battery charger that transfers electricity provided by electric utilities into the vehicle battery to "recharge" it. The primary electric vehicle charging station is located at the residence, business, or fleet facility where the vehicle is garaged. There are also a number of public charging sites that are available.

Charging Equipment: Conductive and inductive (small paddle and large paddle) charging systems are most common; however, some city or neighborhood EVs may be plugged right into a 110-v outlet. Charging equipment is usually sold to consumers by distributors, but in some cases can be purchased directly from the manufacturer.

Charging Time: The amount of time that it takes to charge varies, and depends on how "empty" the battery is, how much energy the battery holds, and other factors. In general, it takes from two to five hours to charge most EVs that are ¼ full to ¾ full, and from four to eight hours to fully charge an electric vehicle from empty to full. Most people find charging at night to be extremely convenient and the primary way that they charge their vehicle.

Fueling Costs: EVs are often charged at home using a separate electricity meter. Electric utilities have offered special rates to EV customers who take advantage of "time-of-use" metering so that they only charge their car at night. This helps the utilities by shifting the demand for electricity needed for EVs to the period when overall demand is at its lowest. The rates offered using these time-of-use meters has been as low as $0.05 per kilowatt-hour. So, charging an EV would cost approximately a dollar a day.

EVs and Energy Use

If 10,000 EVs in California all plugged in at the same time to recharge, they would represent less than 0.06 percent of California's total power demand. Consumer surveys and utility observations note that as many as 95 percent of the State's current EV drivers charge at night while at home, taking advantage of the excess capacity. This excess capacity is as much as 50 percent of the total system's capacity.

EVs use on average a little less than half a kilowatt-hour per mile as they drive. Since Californian's drive an average of about 36 miles per day, a typical estimate of electricity used daily by an EV is about 15 kilowatt-hours.

Public Charging Stations

There are more than 1000 charging stations installed throughout California. It is very easy to use these stations because they are available at a variety of locations, including shopping centers, city parking lots, airports, hotels, government offices, and other businesses. Charging is currently provided at no cost to the driver; however, entrance or parking fees may be applicable. Helpful web sites to find public charging stations in your area, are:

Type of Directory	Internet Address
California Directory maintained by CALSTART	www.cleancarmaps.com
National Directory maintained by U.S Dept of Energy	www.afdc.nrel.gov/altfuel/electric.html
List of chargers maintained by electric vehicle drivers	www.evchargernews.com
San Diego area information provided by San Diego Gas and Electric	www.sdge.com/EV/Maps/index.html
Los Angeles area information, provided by LADWP	www.ladwp.com/ladwp/cms/ladwp000791.jsp

Reporting Charging Equipment Problems

Charging equipment problems may be reported to the following agencies:

Type of Equipment	Phone	Business/Organization
Inductive (all models)	888-890-4638	SMUD/Clean Fuel Connection
Conductive (models ICS-200, MCS-100, DS-50)	888-823-8077	EVI/Electric Vehicle Infrastructure
Conductive (equipment manufactured by Avcon)	800-433-7642	Avcon
Public Chargers		www.cleancarmaps.com

Additional Information

Please contact the ARB toll-free at (800) END-SMOG/(800) 363-7664 (California only) or (800) 242-4450. More information on the Zero Emission Vehicle Program is available on ARB's web site at www.arb.ca.gov/msprog/zevprog/zevprog.htm or at www.DriveClean.ca.gov.

You may obtain this document in an alternative format by contacting ARB's ADA Coordinator at (916) 322-4505 (voice); (916) 324-9531 (TDD, Sacramento area only); or (800) 700-8326 (TDD, outside Sacramento).

The energy crisis facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of sample ways you can reduce demand and cut your energy costs, see our web site: http://www.arb.ca.gov